

**FACT SHEET FOR STATE WASTE DISCHARGE PERMIT ST 5050**  
**GENERAL CHEMICAL CORPORATION**

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**INTRODUCTION**

This fact sheet is a companion document to the draft State Waste Discharge Permit No. ST5050. The Department of Ecology (Ecology) is proposing to issue this permit, which will allow discharge of wastewater to waters of the state of Washington. This fact sheet explains the nature of the proposed discharge, Ecology's decisions on limiting the pollutants in the wastewater, and the regulatory and technical bases for those decisions.

Washington State law (Revised Code of Washington [RCW] 90.48.080 and 90.48.162) requires that a permit be issued before discharge of wastewater to waters of the state is allowed. Regulations adopted by the state include procedures for issuing permits (Chapter 173-216 Washington Administrative Code [WAC]), and water quality criteria for ground waters (Chapter 173-200 WAC). They also establish requirements which are to be included in the permit.

This fact sheet and draft permit are available for review by interested persons as described in Appendix A--Public Involvement Information.

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in these reviews have been corrected before going to public notice. After the public comment period has closed, Ecology will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of Ecology's response. The fact sheet will not be revised. Changes to the permit will be addressed in Appendix C--Response to Comments.

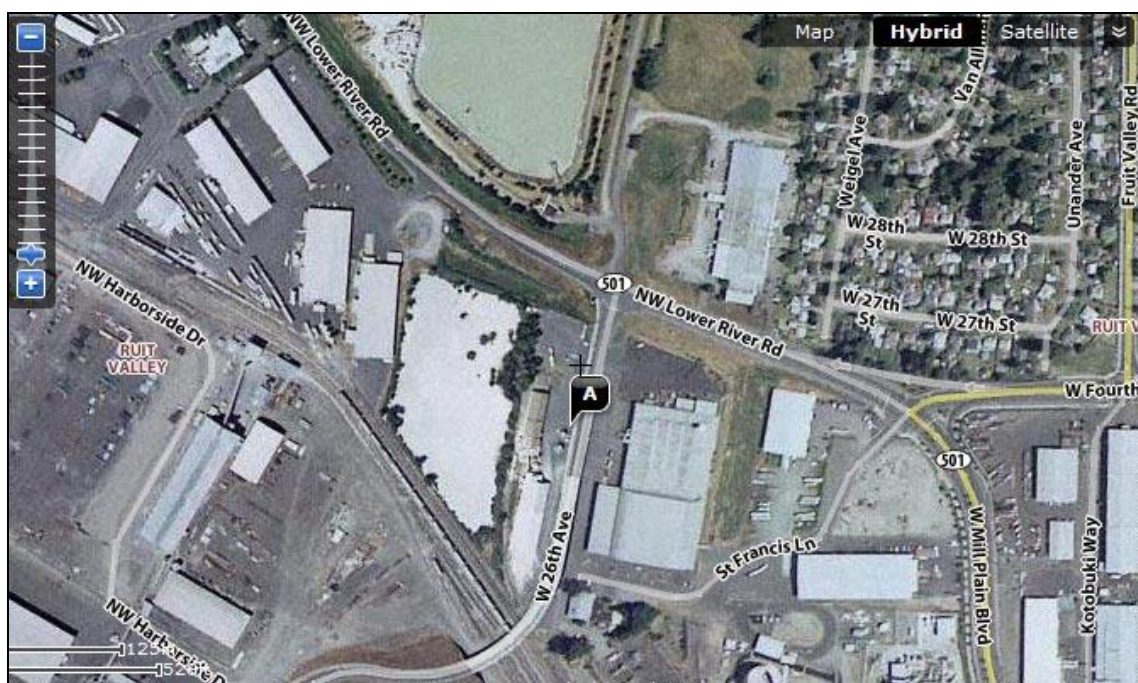
<b>GENERAL INFORMATION</b>	
Applicant	General Chemical Corporation
Facility Address	2611 West 26 <sup>th</sup> Street Extension Vancouver, WA 98660
Type of Facility	Aluminum Sulfate Production (SIC Code 2819)
Type of Treatment:	pH Neutralization followed by land application via infiltration/mud pond
Legal Description of Application Area	Legal Description: Section 21, Range 1E, Township 2N Latitude: 45° 38' 27" N Longitude: 122° 41' 58" W
Responsible Official	Kevin O'Kelley, EHS Manager, Western Region 525 Castro Street, Richmond, CA 94801 Telephone: (510) 237-3869 FAX: (510) 232-7629

## **BACKGROUND INFORMATION**

### *DESCRIPTION OF THE FACILITY*

#### **HISTORY**

General Chemical Corporation operates an aluminum sulfate (alum) manufacturing facility in Vancouver, Washington approximately 0.25 miles north of the Columbia River and two miles southeast of Vancouver Lake (refer to Figure 1). The facility began producing alum in 1941. The facility sells alum to domestic municipal water treatment plants and for other industrial uses. Currently, the facility discharges process wastewater and stormwater to an infiltration/mud pond within the facility boundary. Ecology has permitted this activity under State Waste Discharge Permit ST 5050 since October 12, 1987.



**Figure 1. Vicinity Map.**

#### **INDUSTRIAL PROCESSES**

Sulfuric acid, bauxite ore and/or an alternate alumina source are shipped to the site via railcar. The facility mixes the alumina source, sulfuric acid and water in an agitated tank. The heat of reaction causes the mixture to boil and the resultant steam vents to the atmosphere via a demister. Following digestion and settling, the facility transfers liquid product alum from the reaction tank to storage tanks and transfers the insoluble residue to wash tanks to reclaim residual alum. Employees then neutralize the process residue, consisting primarily of silica, with lime and transfer it to the infiltration/mud pond.

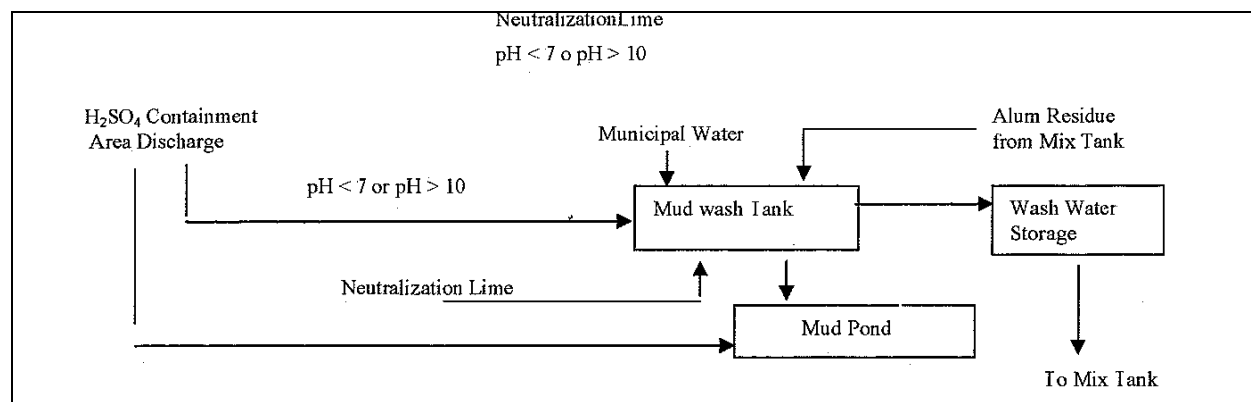
Three people run the plant during day to day operations. The facility makes an average of 6 batches of alum per week. During peak seasons, they manufacture up to 11 batches of alum per week.

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TREATMENT PROCESSES

After decantation of clear liquid, General Chemical adds lime (from Graymont Western, in Tacoma) to the reclamation tanks where it neutralizes the alum residue (pH of 4.0 to 5.0) to a pH of 7.0 before discharge to the infiltration/mud pond (refer to Figure 2) through Outfall 002. Between two to three batch discharges occur on a daily basis. Each batch discharged is approximately 4,000 gallons and consists of approximately 30 percent solid material.

The facility collects and uses stormwater that falls in the sulfuric acid containment area as part of the make-up water for the alum manufacturing process. However it also has the ability to collect and treat this stormwater and discharge it through Outfall 001 to the infiltration/mud pond.



**Figure 2. Schematic Flow Diagram.**

LAND APPLICATION TO INFILTRATION/MUD POND

The infiltration/mud pond is approximately 5.5 acres (refer to Figure 3, next page). The pond is contained by an earthen berm around its boundary. An earthen perimeter berm contains the water in the pond. The facility pumps and spreads the treated waste alum mud slurry and contact stormwater around the infiltration/mud pond. The solids settle out and the liquid either evaporates or infiltrates through the pond to the groundwater.

The solid material in the pond has accumulated since about 1941. The pond started out as a deep pit and currently the accumulated material almost reaches the earthen berm. Facility staff estimates that the solid material is about 30 feet deep.

The mud discharged contains total dissolved solids, iron, chromium, copper, lead, mercury, and sulfate. Evidence shows that the solid material is a naturally occurring radioactive material (NORM). The Washington State Department of Health is conducting inquiries to characterize this material, but at this time (June 2008), there is no evidence that the mud meets or exceeds regulatory thresholds of radiation levels for NORM. Ecology will work with the Department of Health to ensure radioactive material laws and regulations are met.

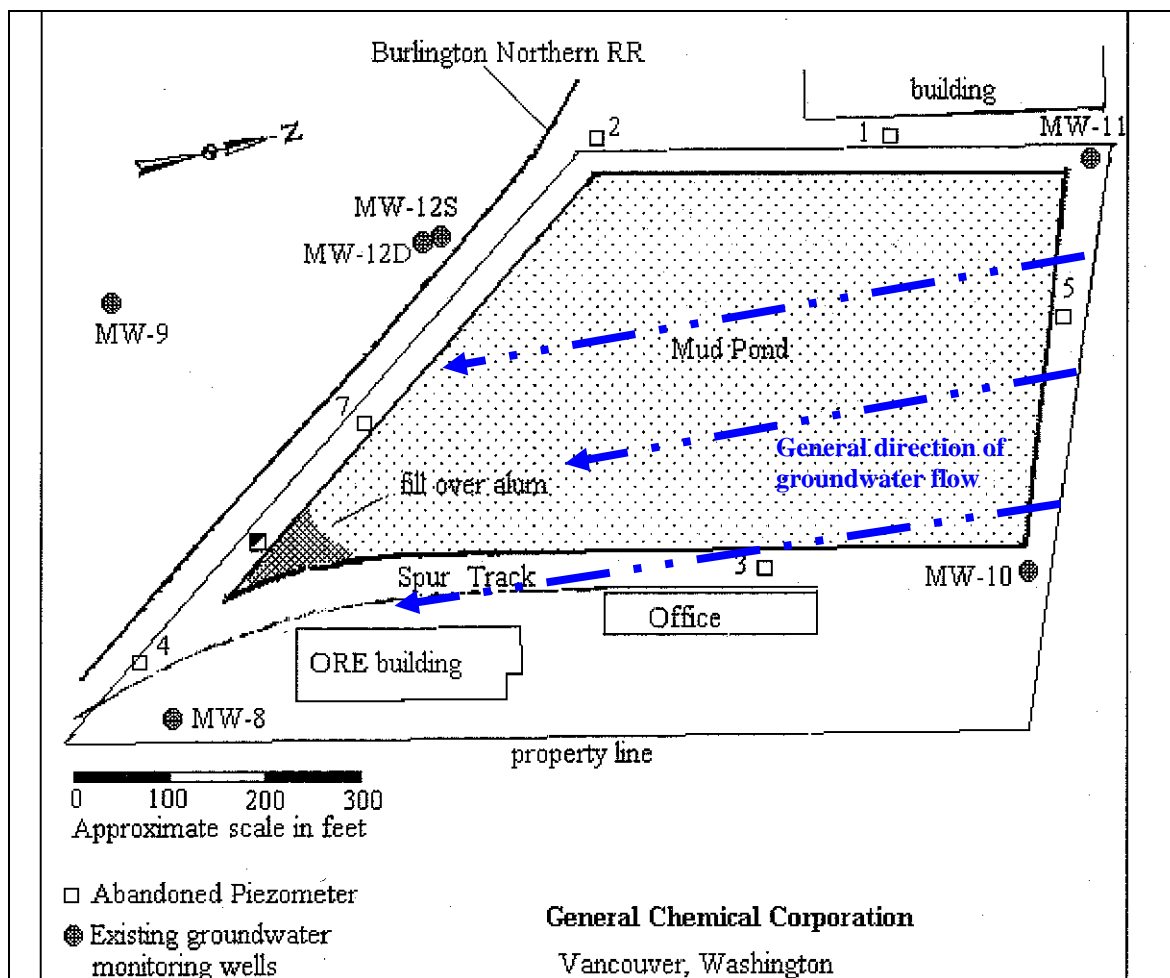


Figure 3. Infiltration/mud Pond Site Plan and Groundwater Monitoring Well Locations.

## GROUND WATER

### HYDROGEOLOGY BASED ON PREVIOUS INVESTIGATIONS

General Chemical has previously described the hydrogeology at the site in reports prepared by HartCrowser (1988) and Environmental Resource Management (ERM) (1999). The 2003 Fact Sheet suggests that although some groundwater discharges into the Columbia River, some also discharges into springs and seeps which in turn feed Columbia River tributary streams.

There are two important aquifers in the area including the Lower Orchards Aquifer and the Troutdale Aquifer. The Lower Orchards Aquifer occurs above the Troutdale Aquifer and is the principal groundwater source for domestic, industrial and municipal use. The Lower Orchards Aquifer has higher transmissivity and well yields than the Troutdale Aquifer.

The city of Vancouver's water supply comes from production wells completed in the Lower Orchards Aquifer, located approximately two miles northeast (upgradient) of the site. These wells are screened approximately 25 feet below mean sea level (MSL) within the Lower Orchards Aquifer. This aquifer zone occurs at a lower elevation beneath the site (at approximately 50 feet below MSL).

According to HartCrowser there are four distinguishable stratigraphic units that influence the groundwater flow at the site including:

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- A shallow perched aquifer consisting of 10 feet of dredged fill material;
- A confining unit consisting of two to 20 feet of discontinuous interbedded silty clay and sandy silt;
- An intermediate zone consisting of medium to fine sand (Orchards Formation);
- Aquifer zone consisting of coarse sand and gravel (Lower Orchards Aquifer).

The perched water table apparently exists during the wetter months of the year. A downward groundwater gradient appears to exist between the shallow perched groundwater zone and intermediate zone, possibly resulting from local mounding due to infiltration of pond discharge. In addition, HartCrowser previously noted that site groundwater is affected by tidal fluctuations associated with the Columbia River (which is located about 1500 feet to the south).

#### WATER QUALITY DATA

The previous State Waste Discharge Permit required General Chemical to submit quarterly water quality results for 5 monitoring wells (MW8B, MW9, MW10, MW11, and MW12B). Selected statistics of the data are provided in Table 1. In the table, ***bold-italicized*** values represent the likely most natural condition (the lowest maximum or lowest mean value for all parameters except pH) and **bold** values represent the most contaminated condition (the highest maximum or highest mean value for all parameters except pH). For pH, the highest value was used to denote the most natural condition, since sludge stored at the site has a low pH. It should be noted that most sample results for arsenic, chromium and iron were non-detect.

**Table 1. Selected summary of results for analyses conducted 7/1/03 through 10/1/07.**

Well #	Max. Diss. As (µg/L) <sup>4</sup>	Max. Diss. Cr (µg/L) <sup>4</sup>	Max. Cond. (mmhos)	Mean Cond. (mmhos)	Min. pH	Mean. pH	Max. TDS (mg/L)	Mean TDS (mg/L)	Max. Sulfate (mg/L)	Mean Sulfate (mg/L)
MW8B	<b>1.93</b>	<b>5.45</b>	0.31	0.25	<b>4.4</b>	5.73	246	204	37.90	30.99
MW9	1.53	3.29	<b>0.61</b>	<b>0.49</b>	<b>5.58</b>	5.93	440	<b>376</b>	<b>92.40</b>	<b>79.77</b>
MW10	<b>1.07</b>	1.18	<b>0.182<sup>1</sup></b>	<b>0.13</b>	5.03	5.75	<b>180</b>	<b>149<sup>2</sup></b>	<b>17.7</b>	<b>10.48</b>
MW11	1.66	<b>1.16</b>	0.47	0.27	4.76	<b>5.6</b>	<b>550</b>	291	43.80	29.01
MW12B	1.63	3.14	0.47	0.39	4.9	<b>6.02</b>	350	303	75.30	54.61
Criteria <sup>3</sup>					6.5 - 8.5	6.5 - 8.5	500	500	250	250
<sup>1</sup> One result (0.973) was not used when averaging the MW10 conductivity data, as it appeared anomalous.										
<sup>2</sup> One result (340) was not used when averaging the MW10 TDS values, as it appeared anomalous.										
<sup>3</sup> Chapter 173-200 WAC groundwater quality criteria.										
<sup>4</sup> The data submitted for these constituents are dissolved concentrations, however, the Chapter 173-200 WAC criteria for As and Cr are listed as total concentrations of 0.05 µg/L and 0.05 mg/L (equivalent to 50 µg/L), respectively.										

#### WATER LEVEL DATA

The water-level data currently provided by General Chemical is in the form of depth to water-level measurements and not water-level elevations. To convert these depth data into elevation data, the elevation of the well measuring points must be known. MW8B replaced well MW8 and MW12B replaced MW12 in 1999. Because there are no records in Ecology's file indicating the measuring point elevations for the new wells, only water-level data provided for MW9, MW10 and MW11 were recently evaluated

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by Ecology (Culhane, 2008). Confirmation of the elevations for all of the wells is required in the proposed permit (see Permit Condition S7).

Based on the previous consultant's report, groundwater flow is generally southwesterly toward the Columbia River. Ecology's more recent analyses suggest that the groundwater gradient beneath the site is quite small, and that groundwater flow may actually be reversed from MW9, north to MW10 or MW11. This interpretation conflicts with earlier investigations. A likely explanation for the discrepancy is that the elevation data for the well measuring points are incorrect. For this reason, it is important that the Groundwater Monitoring Plan (Special Condition S7, of the proposed permit) include submission of accurate measuring point elevations for both MW8B and MW12B.

For the purpose of the groundwater analysis Ecology conducted to draft this proposed permit, MW10 and MW11 were used to provide a general indication of background conditions. The more conservative value from either of these two monitoring wells was used.

*PERMIT STATUS*

The previous permit for this facility was issued on July 1, 2003.

An application for permit renewal was received by Ecology on January 3, 2008, and accepted by Ecology on January 31, 2008.

*SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT*

The facility last received a compliance inspection on September 4, 2007, by John Diamant, P.E, and Jacek Anuszewski, P.E.

During the history of the previous permit, the Permittee has largely remained in compliance based on Discharge Monitoring Reports (DMRs) and other reports submitted to Ecology and inspections conducted by Ecology.

The only noncompliance (based on Ecology's records) was the non-submittal of the required quarterly groundwater monitoring data for MW 9 for the fourth quarter 2007.

*WASTEWATER CHARACTERIZATION*

The 2003 permit required General Chemical to submit monitoring data for the process wastewater (Outfall 002) discharge. The parameters monitored and reported on a monthly basis included: flow, minimum pH, and maximum pH. The 2003 permit also required the facility to monitor TDS, dissolved arsenic, dissolved chromium, iron, and sulfate be monitored on a quarterly basis. The data reported July 1, 2003, through December 1, 2007, are summarized in Table 2.

**Table 2. Outfall 002 Discharge Characterization Summary.**

<b>Parameter</b>	<b>Average</b>	<b>Maximum</b>
Flow, gpd	8,950	15,096
TDS, mg/L	3,398	5,400
pH, standard units	Between 8.49 and 6.51. Average is 7.50	
Dissolved Arsenic, µg/L	145	250
Dissolved Chromium, µg/L	933	3,900
Iron, mg/L	154	510
Sulfate, mg/L	1,838	2,600



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Between July 1, 2003, and December 1, 2007, the maximum concentrations recorded in Outfall 002 were 5400 mg/L for total dissolved solids (September 1, 2007), 3900 µg/L for dissolved chromium (October 1, 2006), and 2600 mg/L for sulfate (July 1, 2003).

Upon Ecology's request, a sample was collected on October 8, 2007, and analyzed for priority pollutant metals, sulfate, and TDS. Table 3 provides a summary of only the parameters the facility detected that time. For this sample, the facility measured total metals. The results for those parameters exceeding the Groundwater Quality Standards (Chapter 173-200 WAC) criteria are indicated in **bold-type**.

**Table 3. Potential Impact of Outfall 002 Discharge on Groundwater Quality (Based on Priority Pollutant Metals Scan on October 8, 2007)**

<b>Parameter*</b>	<b>Outfall 002 Discharge Concentration</b>	<b>Groundwater Quality Criteria</b>
Chromium, mg/L	1.5	0.05
Copper, mg/L	0.1	1.0
Lead , mg/L	0.08	0.05
Mercury, mg/L	0.09	0.002
Iron, mg/L	110	0.30
Sulfate, mg/L	1,800	250
TDS, mg/L	4,500	500
*It is unknown whether the priority pollutant scan measured total metals or dissolved metals.		
**Note: the groundwater quality criteria cannot be directly applied to the discharge from Outfall 002 since there will be some removal of contaminants as the discharge flows through the ground substrate. This table presents the potential impacts assuming no removal occurs and should be used for comparison purposes only.		

The facility did not report a discharge from Outfall 001 during the 2003 permit cycle.

*SEPA COMPLIANCE*

There are no known SEPA compliance issues for this facility at this time.

**PROPOSED PERMIT LIMITATIONS**

State regulations require that limitations set forth in a waste discharge permit must be either technology- or water quality-based. Wastewater must be treated using all known, available, and reasonable treatment (AKART) and not pollute the waters of the state. The more stringent of the water quality-based or technology-based limits are applied to each of the parameters of concern. Each of these types of limits is described in more detail below.

*TECHNOLOGY-BASED EFFLUENT LIMITATIONS*

All waste discharge permits issued by Ecology must specify conditions requiring available and reasonable methods of prevention, control, and treatment of discharges to waters of the state (WAC 173-216-110).

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pH - The Outfall 001 and 002 pH permit limitations are necessary to satisfy the requirement for AKART.

The minimum requirements to demonstrate compliance with the AKART standard were originally established in a previous permit with the requirement to neutralize the effluent to a pH between 7.0 and 10 prior to discharge to the mud pond. The facility conducted an assessment of existing hydrogeologic conditions at the site in a report to Ecology in January of 1988. At that time, a hydrogeologic study, an assessment of the groundwater quality (particularly the background quality) and an evaluation of AKART for the discharge prior to (or including) land application was not fully completed.

When the permit came up for renewal, Ecology re-evaluated the AKART determination for pH (pH must be neutralized between 7.0 and 10) for two reasons. First, the ground water standard was revised in December 1990 and established pH criteria to range between 6.5 to 8.5. Second, the amount of lime required to increase the pH of the discharge from <4 to a value in the range 6.5 to 8.5 would be less than that required to increase the pH to between 7.0 and 10. General Chemical Corporation demonstrated this in a laboratory experiment reported in the letter to Ecology dated June 19, 1997. The facility conducted the laboratory experiment to demonstrate the resistance of the process wastewater to pH changes upon addition of lime. The facility would need to add more than 10 times the amount of lime to process wastewater compared to the amount needed for tap water, for the same pH increment. Thus, reducing the target pH range would reduce the amount of lime required. Approximately, 66 tons of lime is required annually for neutralization.

Furthermore, groundwater quality data collected shows that the upgradient groundwater is acidic (around a pH of 4.0 – 5.0). The neutralization of the discharged water actually helps to raise the pH of the receiving groundwater towards compliance. Therefore, there is no reason to require more stringent pH treatment at this time.

In this proposed permit, Ecology retains the same technology-based pH limit range of 6.5 to 8.5.

Other pollutants – After the solid waste from the facility is handled more appropriately (as discussed in the next section of this Fact Sheet), it is anticipated that groundwater quality standards can be met and that other pollutants may not be of concern. Since Ecology believes that the improper management of solid waste results in groundwater impairment, it is almost impossible to determine which pollutants in the process water (not including the solid waste portion of the mud) would require treatment. It is recommended to focus on encouraging proper solid waste management in this permit cycle and re-evaluate this issue during the next permit renewal. More data will be available and, hopefully, the discharge of leachate from the facility will be eliminated.

*GROUND WATER QUALITY-BASED EFFLUENT LIMITATIONS*

It is the policy of the state of Washington to maintain the highest possible standards to insure the purity of all waters of the state consistent with public health and enjoyment, and the protection of aquatic life and wildlife; RCW 90.48. This antidegradation policy mandates the protection of background ground water quality and prevents the degradation of water quality that would harm an existing or future beneficial use [refer to WAC 173-200-030].

In order to protect existing water quality and preserve the designated beneficial uses of Washington's ground waters including the protection of human health, WAC 173-200-100 states that waste discharge permits shall be conditioned in such a manner as to authorize only activities that will not cause violations of the Ground Water Quality Standards. The goal of the ground water quality standards is to maintain the highest quality of the State's ground waters and to protect existing and future beneficial uses of the ground water through the reduction or elimination of the discharge of contaminants to ground water

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[WAC 173-200-010(4)]. This goal is achieved by [refer to *Implementation Guidance for the Ground Water Quality Standards*, Abstract, page x (Ecology, Revised October 2005)]:

1. Applying AKART (all known available and reasonable methods of prevention, control and treatment) to any discharge;
2. Applying the antidegradation policy of the ground water quality standards. This policy mandates protecting background water quality to the extent practicable and preventing degradation of water quality which would harm a beneficial use or violate the ground water quality standards; and
3. Establishing numeric and narrative criteria for the protection of human health and the environment in the ground water quality standards.

The procedures for estimating background water quality are contained in the *Implementation Guidance for the Ground Water Quality Standards* (Ecology, Revised October 2005). Background water quality is defined as the 95 percent upper tolerance interval with a 95 percent confidence.

Applicable ground water criteria as defined in Chapter 173-200 WAC and in RCW 90.48.520 for this discharge include the following:

**Table 4: Ground Water Quality Criteria.**

<b>Parameter</b>	<b>Criteria</b>
pH	6.5 to 8.5 standard units
Total Dissolved Solids	500 mg/L
Sulfate	250 mg/L
Total Iron	0.3 mg/L
Total Arsenic	0.05 µg/L
Total Chromium	0.05 mg/L
Total Lead	0.05 mg/L
Total Mercury	0.002 mg/L
Gross Alpha Particle Activity	15 pCi/L
Gross Beta Particle Radioactivity	50 pCi/L
Radium 226 & 228	5 pCi/L
Radium 226	3 pCi/L

Ecology has reviewed existing records and is unable to determine background ground water quality. The permit requires the collection of more rigorous ground water quality data to establish the upgradient (background) quality of the ground water. Until the background water quality is determined, the facility must operate within the approved design parameters and comply with all conditions in the permit. Some of the contamination may be attributed to the leaching of pollutants from the spent mud/silt which has been accumulating in the infiltration/mud pond for over 60 years.

It should be noted that the permit does not authorize the discharge of leachate from the solid waste portion of the “mud” which has been accumulating for decades and the facility should prevent this through proper management of their solid waste stream. A liner should be installed or the solid waste portion of the mud should be separated from the liquid process wastewater and disposed of off-site. Ecology reserves the right to include additional treatment requirements and limitations to discharges from Outfall 001 and 002. At the present time, Ecology believes that once the current accumulated solids are removed and the solid

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waste stream is properly managed, the impacts to groundwater will be significantly reduced. As such, Ecology proposed groundwater quality enforcement limits for MW8B. The enforcement limits incorporate an analysis of the groundwater data and the groundwater quality standards. For all the parameters except for sulfate, the limit was set at the groundwater criteria concentration. Ecology set the limit for sulfate at 10 percent above the highest concentration measured (in MW9). This essentially strives to hold the line to ensure that sulfate concentrations in the groundwater do not increase further.

The early warning values were, for the most part, set at one-half the concentration of the enforcement limits. The exceptions include: pH, sulfate, and TDS. For pH, a realistic early warning value was selected to provide a warning before a pH of 5.25 would be measured. For sulfate and TDS, Ecology determined that the monitoring data was reliable enough to perform early warning value calculations as required in WAC 173-200-070 and Ecology's Groundwater Quality Standards Implementation Guidance (Pub. No. 96-02).

Table 5 provides a summary of the recommended groundwater quality enforcement limits and early warning values which apply to monitoring well MW8B.

**Table 5. Groundwater Quality Enforcement Limits and Early Warning Values Applicable to MW8B.**

<b>Parameter</b>	<b>Enforcement Limit</b>	<b>Early Warning Value</b>	<b>Units</b>
Total Iron	0.3	0.15	mg/L
Total Arsenic	Not to exceed background, upgradient concentrations		
Total Chromium	0.05	0.03	mg/L
Total Lead	0.05	0.025	mg/L
Total Mercury	0.002	0.001	mg/L
Lower limit of pH	5.25	5.5	s.u.
Sulfate	100	55	mg/L
TDS	500	325	mg/L

**ANTIDEGRADATION**

The Antidegradation policy within the state of Washington's Ground Water Quality Standards requires that beneficial uses of ground water be preserved. In cases where ground water quality is above the criteria, the background concentrations shall constitute the water quality criteria. In these cases, discharges to ground water shall not degrade the existing water quality. When the ground water quality is below the criteria, the existing water quality shall be protected. More information on the Antidegradation Policy can be obtained by referring to WAC 173-200-030.

**COMPARISON OF LIMITATIONS WITH THE EXISTING PERMIT ISSUED 07-01-2003**

The pH differential limit between Outfall 001 and rainwater has been eliminated. This limit has rarely/never been used as stormwater collected in the sulfuric acid containment area is now recycled and used as make-up water for alum manufacturing. Consequently, it is recommended that Outfall 001 be eliminated in the next permit if it is still inactive during the proposed permit cycle. The pH differential limit was also unfairly restrictive since the discharge is to the infiltration/mud pond which is already required to meet groundwater criteria at the end of pipe.

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This proposed permit establishes groundwater quality limits for total iron, total arsenic, total chromium, total lead, total mercury, sulfate, total dissolved solids, and pH. This is a significant change since the 2003 permit did not include groundwater limits.

**Table 6: Comparison of Previous Limits and New Limits.**

Parameter	Previous Limits	Proposed Limits
<b><i>Outfall 001</i></b>		
pH, s.u.	6.5 to 8.5	Same
pH differential from rainwater, s.u.	0.3	None
<b><i>Outfall 002</i></b>		
Flow, gpd	19,800	Same
pH, s.u.	6.5 to 8.5	Same
<b><i>MW 8B</i></b>		
Total Iron, mg/L	None	0.3
Total Arsenic, µg/L	None	Not to exceed upgradient concentrations
Total Chromium, µg/L	None	50
Total Lead, µg/L	None	50
Total Mercury, µg/L	None	2
Sulfate, mg/L	None	100
TDS, mg/L	None	500
pH, s.u.	None	5.25 to 8.5

**MONITORING REQUIREMENTS**

Monitoring, recording, and reporting are specified to verify that the treatment process is functioning correctly, that ground water criteria are not violated, and that effluent limitations are being achieved (WAC 173-216-110).

**WASTEWATER MONITORING**

The monitoring schedule is detailed in the proposed permit under Condition S2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

Monitoring for total lead, total mercury, gross alpha and beta particle radioactivity, Radium 226, and Radium 228 is being required to further characterize the effluent. Radioactivity monitoring is required to be conducted on a quarterly basis. The new additional pollutants identified could have a significant impact on the quality of the ground water.

**GROUND WATER MONITORING**

The monitoring of ground water at the site is required in accordance with the Ground Water Quality Standards, Chapter 173-200 WAC. Ecology has determined that this discharge has a potential to pollute the ground water. Therefore the Permittee is required to evaluate the impacts on ground water quality. Monitoring of the ground water at the site boundaries and within the site is an integral component of such an evaluation.

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Additional monitoring has been identified to ensure that groundwater quality standards have been met. This monitoring will also help to establish a baseline, upgradient groundwater concentration which will assist Ecology in implementing Antidegradation Standards. New additional parameters required for monitoring include: ferrous iron, total lead, total mercury, gross alpha and beta particle radioactivity, Radium 226, and Radium 228. Radioactivity monitoring is required to be conducted on a quarterly basis. Monitoring is required for monitoring wells MW-11, MW-10, MW-9, and MW-8B.

General Chemical was previously required to monitor for total iron. The proposed new requirement to monitor for ferrous iron is inexpensive, can be done in the field, and provides more information on whether or not the groundwater is anoxic. The objective for establishing the proposed new requirement to monitor for total lead and total mercury is to collect data to evaluate whether or not the discharge may have an adverse impact on groundwater quality. These two parameters were identified in a priority pollutant metals scan of the "mud" collected on October 8, 2007. The new proposed requirement to monitor for radiation will provide additional information to evaluate the risks and concerns regarding the radioactive nature of the discharge.

Previously groundwater monitoring was conducted on a quarterly basis. This proposed permit increases the frequency for groundwater monitoring to a monthly basis (except radioactive monitoring which is required quarterly). The reason for the increased monitoring frequency is based upon three issues: 1) groundwater data already indicate degradation of groundwater beneath the site; 2) groundwater concentrations for arsenic, pH, and TDS already exceed groundwater quality criteria; and 3) lead and mercury were found to present at elevated levels in the treated process wastewater discharge.

It is also worth noting that in the previous permit, groundwater monitoring did not specify that sampling and testing should be for the total fraction of the metals. As a result, arsenic and chromium monitoring was done on the dissolved fraction of the metals. This is inconsistent with the groundwater quality standards which specify metals criteria as the total fraction. The proposed permit addresses this inconsistency by requiring the monitoring of total metals.

## **OTHER PERMIT CONDITIONS**

### *REPORTING AND RECORDKEEPING*

The conditions of S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-216-110).

### *OPERATIONS AND MAINTENANCE MANUAL*

The proposed permit contains condition S5. as authorized under Chapter 173-240-150 WAC and Chapter 173-216-110 WAC. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

The O&M Manual must be reviewed annually and updated as necessary. Updates to the L&M Manual must be submitted to Ecology. If no updates were made, then a copy of the existing O&M Manual must be submitted to Ecology along with the permit renewal application.

### *SOLID WASTE CONTROL PLAN*

Ecology has determined that the Permittee has a potential to cause pollution of the waters of the state from leachate of solid waste.

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This proposed permit requires, under authority of RCW 90.48.080, that the Permittee develop and submit to Ecology a solid waste plan to prevent solid waste from causing pollution of waters of the state. This Plan must be reviewed annually and updated as needed. Updates to the Solid Waste Control Plan must be submitted to Ecology.

*SPILL PLAN*

Ecology has determined that the Permittee stores a quantity of chemicals that have the potential to cause water pollution if accidentally released. Ecology has the authority to require the Permittee to develop best management plans to prevent this accidental release under section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080.

The Permittee has developed a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs. The proposed permit requires the Permittee to annually review this plan and update it as needed. Updates to the Spill Plan must be submitted to Ecology. If no updates were made, then an existing copy of the Spill Plan must be submitted to Ecology along with the permit renewal application.

*GROUNDWATER MONITORING PLAN*

In accordance with WAC 173-200-080, the permit requires the Permittee to prepare and submit a Groundwater Monitoring Plan for Ecology approval. The monitoring plan must identify the locations of the monitoring wells and provide as-built construction drawings showing elevations of the wells and substrata profile. The plan must also provide groundwater sampling and well maintenance procedures.

*GENERAL CONDITIONS*

General Conditions are based directly on state laws and regulations and have been standardized for all industrial waste discharge to ground water permits issued by Ecology.

Condition G1. requires responsible officials or their designated representatives to sign submittals to Ecology. Condition G2. requires the Permittee to allow Ecology to access the treatment system, production facility, and records related to the permit. Condition G3. specifies conditions for modifying, suspending or terminating the permit. Condition G4. requires the Permittee to apply to Ecology prior to increasing or varying the discharge from the levels stated in the permit application. Condition G5. requires the Permittee to construct, modify, and operate the permitted facility in accordance with approved engineering documents. Condition G6. prohibits the Permittee from using the permit as a basis for violating any laws, statutes or regulations. Conditions G7. relates to permit transfer. Condition G8. requires the payment of permit fees. Condition G9. describes the penalties for violating permit conditions.

**RECOMMENDATION FOR PERMIT ISSUANCE**

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to control toxics, and to protect human health and the beneficial uses of waters of the state of Washington. Ecology proposes that the permit be issued for five years.

**REFERENCES FOR TEXT AND APPENDICES**

Culhane, Tom, March 4, 2008. Memorandum to John Diamant re: General Chemical Vancouver Works State Waste Discharge Permit (No. ST 5050).

*FACT SHEET FOR STATE WASTE DISCHARGE PERMIT ST5050*  
*GENERAL CHEMICAL CORPORATION*

Environmental Resources Management, January 1999. Groundwater and well Location Plan, General Chemical facility, Vancouver, Washington.

Faulkner, S.P., Patrick Jr., W.H., Gambrell, R.P., May-June, 1989. Field Techniques for Measuring Wetland Soil Parameters, Soil Science Society of America Journal, Vol. 53, No.3.

Hart Crowser, 1988. Preliminary Assessment of Existing Hydrogeologic Conditions at General Chemical Facility, Vancouver, Washington.

Washington State Department of Ecology, 1993. Guidelines for Preparation of Engineering Reports for Industrial Wastewater Land Application Systems, Ecology Publication # 93-36. 20 pp.

Washington State Department of Ecology.

Laws and Regulations( <http://www.ecy.wa.gov/laws-rules/index.html> )

Permit and Wastewater Related Information

(<http://www.ecy.wa.gov/programs/wq/wastewater/index.html>)

Washington State Department of Ecology, 1996. Implementation Guidance for the Ground Water Quality Standards, Ecology Publication # 96-02.

Washington State University, November, 1981. Laboratory Procedures - Soil Testing Laboratory. 38 pp.



## APPENDICES

### APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

Ecology has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on March 1, 2007, and March 9, 2007, in the *Columbian* to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

Ecology will publish a Public Notice of Draft (PNOD) on July 11, 2008, in the *Columbian* to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Industrial Unit Permit Coordinator  
Department of Ecology  
Southwest Regional Office  
P.O. Box 47775  
Olympia, Washington 98504-7775

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the 30 day comment period to the address above. The request for a hearing shall indicate the interest of the party and reasons why the hearing is warranted. Ecology will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-216-100). Public notice regarding any hearing will be circulated at least 30 days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing.

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

Ecology will consider all comments received within 30 days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. Ecology's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from Ecology by telephone, 360-407-6280, or by writing to the address listed above.

This permit was written by John Y. Diamant, P.E.

**APPENDIX B--GLOSSARY**

**AKART**--The acronym for “all known, available, and reasonable methods of prevention, control and treatment.” AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and 520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

**Alternate Point of Compliance**--An alternative location in the ground water from the point of compliance where compliance with the ground water standards is measured. It may be established in the ground water at locations some distance from the discharge source, up to, but not exceeding the property boundary and is determined on a site specific basis following an AKART analysis. An “early warning value” must be used when an alternate point is established. An alternate point of compliance must be determined and approved in accordance with WAC 173-200-060(2).

**Ambient Water Quality**--The existing environmental condition of the water in a receiving water body.

**Ammonia**--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

**Average Monthly Discharge Limitation**--The average of the measured values obtained over a calendar month's time.

**Background water quality**--The concentrations of chemical, physical, biological or radiological constituents or other characteristics in or of ground water at a particular point in time upgradient of an activity that has not been affected by that activity, [WAC 173-200-020(3)]. Background water quality for any parameter is statistically defined as the 95 percent upper tolerance interval with a 95 percent confidence based on at least eight hydraulically upgradient water quality samples. The eight samples are collected over a period of at least one year, with no more than one sample collected during any month in a single calendar year.

**Best Management Practices (BMPs)**--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

**BOD<sub>5</sub>**--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD<sub>5</sub> is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

**Bypass**--The intentional diversion of waste streams from any portion of the collection or treatment facility.

**Compliance Inspection - Without Sampling**--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

**Compliance Inspection - With Sampling**--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Additional sampling may be conducted.

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**Composite Sample**--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

**Construction Activity**--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

**Continuous Monitoring** --Uninterrupted, unless otherwise noted in the permit.

**Distribution Uniformity**--The uniformity of infiltration (or application in the case of sprinkle or trickle irrigation) throughout the field expressed as a percent relating to the average depth infiltrated in the lowest one-quarter of the area to the average depth of water infiltrated.

**Early Warning Value**--The concentration of a pollutant set in accordance with WAC 173-200-070 that is a percentage of an enforcement limit. It may be established in the effluent, ground water, surface water, the vadose zone or within the treatment process. This value acts as a trigger to detect and respond to increasing contaminant concentrations prior to the degradation of a beneficial use.

**Enforcement limit**--The concentration assigned to a contaminant in the ground water at the point of compliance for the purpose of regulation, [WAC 173-200-020(11)]. This limit assures that a ground water criterion will not be exceeded and that background water quality will be protected.

**Engineering Report**--A document, signed by a professional licensed engineer, which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

**Ground water**--Water in a saturated zone or stratum beneath the surface of land or below a surface water body.

**Grab Sample**--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

**Industrial Wastewater**--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

**Maximum Daily Discharge Limitation**--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Method Detection Level (MDL)**--The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

**pH**--The pH of a liquid measures its acidity or alkalinity. A pH of 7.0 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

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**Point of Compliance**--The location in the ground water where the enforcement limit shall not be exceeded and a facility must be in compliance with the Ground Water Quality Standards. It is determined on a site specific basis and approved or designated by Ecology. It should be located in the ground water as near and directly downgradient from the pollutant source as technically, hydrogeologically, and geographically feasible, unless an alternative point of compliance is approved.

**Quantitation Level (QL)**--A calculated value five times the MDL (method detection level).

**Soil Scientist**--An individual who is registered as a Certified or Registered Professional Soil Scientist or as a Certified Professional Soil Specialist by the American Registry of Certified Professionals in Agronomy, Crops, and Soils or by the National Society of Consulting Scientists or who has the credentials for membership. Minimum requirements for eligibility are: possession of a baccalaureate, masters, or doctorate degree from a U.S. or Canadian institution with a minimum of 30 semester hours or 45 quarter hours professional core courses in agronomy, crops or soils, and have 5,3,or 1 years, respectively, of professional experience working in the area of agronomy, crops, or soils.

**Soluble BOD<sub>5</sub>**--Determining the soluble fraction of Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of soluble organic material present in an effluent that is utilized by bacteria. Although the soluble BOD test is not specifically described in Standard Methods, filtering the raw sample through at least a 1.2 um filter prior to running the standard BOD<sub>5</sub> test is sufficient to remove the particulate organic fraction.

**State Waters**--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

**Stormwater**--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

**Technology-based Effluent Limit**--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

**Total Coliform Bacteria**--A microbiological test which detects and enumerates the total coliform group of bacteria in water samples.

**Total Dissolved Solids**--That portion of total solids in water or wastewater that passes through a specific filter.

**Total Suspended Solids (TSS)**--Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

**Water Quality-based Effluent Limit**--A limit on the concentration of an effluent parameter that is intended to prevent pollution of the receiving water.

### **APPENDIX C--RESPONSE TO COMMENTS**

Comments were received by Ecology from General Chemical Corporation (GC) on August 12, 2008. The comments were accepted and considered before the proposed draft permit was prepared for issuance. GC's comments are provided below followed by Ecology's responses.

#### **COMMENT 1**

The draft permit contains a number of provisions that are unnecessary to protect groundwater quality and difficult and unjustifiably expensive to comply with. In general, GC estimates that the additional, unwarranted sampling and analyses required by this draft permit will cost approximately \$46,000 per year for a total of approximately one-quarter million dollars over the proposed five (5) year permit period. GC feels that these changes to the permit requirements are especially onerous given that the draft permit states that water quality during the previous permit period was in compliance with permit requirements. Specific comments on the draft permit appear below.

#### **ECOLOGY'S RESPONSE 1**

*Ecology understands that the required additional monitoring will result in increased costs and may seem difficult, onerous and unnecessary. However, none of the requirements set forth in the draft permit were outside of Ecology's jurisdiction to protect groundwater quality. All of the proposed monitoring requirements were derived based on best professional judgement using new information that there may be other pollutants of concern that were not adequately addressed in the previously issued permit; and the lack of high quality data with lower detection limits that can better determine whether groundwater standards are met. Both the groundwater criteria and the antidegradation policy as defined in the Groundwater Quality Standards (Washington Administrative Code 173-200) must be met. In GC's case, the data were sufficient to show that the criteria can be met but were insufficient to be able to establish upgradient groundwater conditions necessary to determine whether the antidegradation policy has been complied with.*

*GC's comment states that they were in compliance with the previous permit's requirements. Ecology's records show that there was one instance of noncompliance which was a non-submittal of the required quarterly groundwater monitoring data for MW9 for the fourth quarter 2007. Even though permit limitations have been met in the previous permit, the assumed compliance with the groundwater quality standards is based on the available information at the time the permit was developed. Compliance with a discharge does not automatically ensure compliance with the water quality standards.*

*Ecology did not verify GC's cost estimates provided in their comments. However, it was clear that GC is concerned about the additional financial burden that would occur from increased monitoring. Given our current economic times and GC's financial concerns, Ecology agrees to take into consideration monitoring frequency and costs while ensuring that sufficient monitoring data is collected. Ecology's specific decisions are provided under responses to the Specific Comments (below).*

#### **COMMENTS 2 (page 1 of 19 of the draft permit)**

An effective date of July 1, 2008 is identified on the cover sheet of the permit. The effective date should be changed to reflect a date after the close of the public comment and incorporation of any comments received from the public and GC, the Permittee. Therefore, GC requests that the Washington Department of Ecology ("DOE") change the effective date to a date no earlier than the date of permit issuance.

#### **ECOLOGY'S RESPONSE 2**

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*Ecology agrees that the effective date should be changed. The effective date was changed to October 1, 2008.*

**COMMENT 3** (page 4 of 19 of the draft permit)

Three of the proposed submittal deadlines are likely to be triggered before or shortly after the issuance of the draft permit. Specifically, the first monthly Discharge Monitoring Report (“DMR”) must be submitted by August 15, 2008, which will mostly likely be in advance of permit issuance. Note that GC is also challenging the change of many quarterly monitoring requirements to monthly requirements and is providing detailed comments below. Therefore, GC requests that DOE change the first DMR submittal date to the 15<sup>th</sup> of the month following the first full month after the date of issuance of the permit.

Further, the proposed submittal deadlines for the Solid Waste Control Plan and the Groundwater Monitoring Plan are September 30, 2008. GC believes that these submittal deadlines should be tied to the issuance date of the permit. Therefore, GC requests that the DOE change the September 30, 2008 deadlines to a deadline “within 90 days of issuance of the permit.”

**ECOLOGY’S RESPONSE 3**

*Ecology agrees that the first monthly Discharge Monitoring Report (DMR) must coincide with the permit’s effective date. The first monthly DMR submittal date has been changed to November 15, 2008.*

*Ecology agrees that the report submittals should be changed to reflect the change in the permit’s effective date. The solid waste control plan and the groundwater monitoring plan due dates were changed to December 31, 2008.*

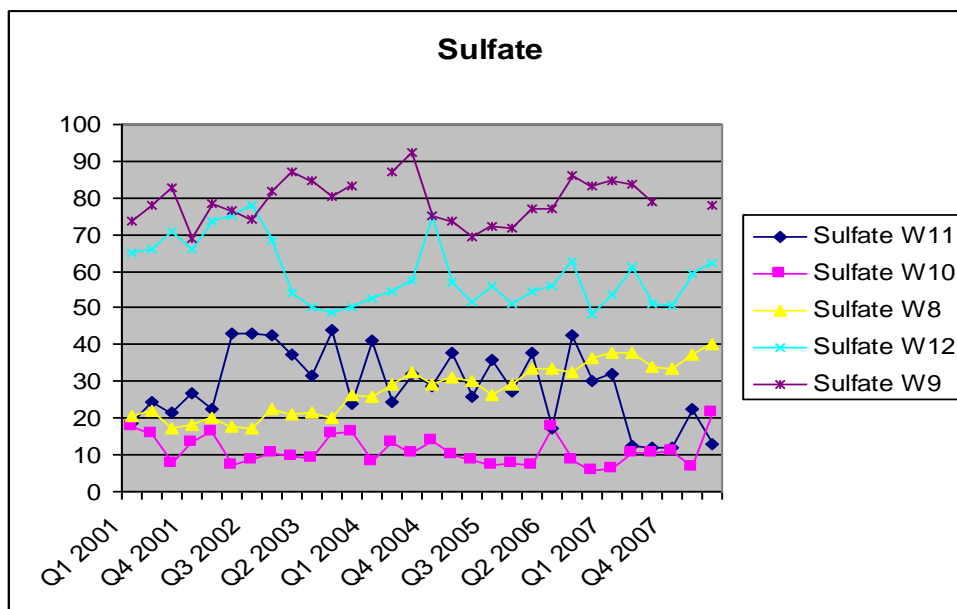
**COMMENT 4**

**S1. DISCHARGE LIMITATIONS**

**B. Groundwater Enforcement Limitations and Early Warning Values** (pages 5 and 6 of 19)

The draft Permit Special Condition S1.B retains the early warning values for most constituents at one-half of the groundwater enforcement limits. However, the early warning value for sulfate is proposed to be set at less than one-quarter of the groundwater enforcement limit. Specifically, the federal and State regulatory enforcement limit for sulfate is 250 milligrams per liter (“mg/l”). See Wash. Admin. Code § 173-200-040 and 40 C.F.R. § 143.3. The proposed enforcement limit, which would only be applicable to Well 8, is 100 mg/l, with an early warning value of 55 mg/l. As indicated in the graph below, sulfate concentrations at the site wells are relatively consistent and are less than both the proposed permit enforcement limit and the enforcement limit identified in Wash. Admin. Code § 173-200-040 and 40 C.F.R. § 143.3.

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Therefore, GC hereby requests that, consistent with the federal and State regulatory limits, the DOE set the enforcement limit for sulfate at 250 mg/l and the early warning value for sulfate at 125 mg/l for Well W8 in the final permit.

#### **ECOLOGY'S RESPONSE 4**

*Ecology does not agree that the sulfate groundwater enforcement limit needs to be changed. The groundwater enforcement limit was based on groundwater data from all of the facility's routinely monitored groundwater monitoring wells. Ecology believes that by setting the sulfate enforcement limit at 100 mg/L, the facility is provided with more than adequate allowance for a "cushion" before monitoring well MW8 exceeds the limit. Previously collected data shows that the highest sulfate concentration measured at MW8 was 37.9 mg/L. However, the concentrations at MW8 has been steadily increasing.*

*Upgradient wells: MW11 and MW10 suggest the upgradient sulfate concentration can be established at approximately 45 mg/L. This would support the argument that the proposed enforcement limit is actually too high. However data from wells: MW9 and MW12 show that higher sulfate concentrations (as high as 92.4 mg/L) is measured in the area but not directly downstream of the mudpond. Since there is somewhat conflicting data, Ecology decided to set the enforcement limit based on the higher sulfate concentrations measured in MW9. No change was made to the sulfate enforcement limit.*

*Ecology also does not agree that the proposed sulfate early warning value should be increased. The monitoring trend of sulfate shows that it is steadily increasing from 2001 to present. Back in 2001, the sulfate concentration was approximately 20 mg/L. It has now almost doubled to 37.9 mg/L. If no changes occur and the trend continues, the early warning value would trigger in approximately 2-3 years. The early warning value provides a means to call attention to permitted pollutants which are increasing in the groundwater and the Permittee must begin evaluating the potential causes and whether or not there is something that can be done to reduce the discharge of the pollutant through the use of best management practices, pollutant source reduction, or treatment. The early warning value is provided to help prevent exceedances to the enforcement limits. No change was made to the sulfate early warning value.*

**COMMENT 5**

**S2. MONITORING REQUIREMENTS**

**A. Wastewater Monitoring**

**1. *Monitoring Frequency*** (pages 6 through 8 of 19)

The draft Permit Special Condition S2.A proposes to change the frequency of wastewater analysis from quarterly to monthly. The concentrations and observed limited variability in the analytical data over time do not support this change in sampling frequency, and the homogeneity of the raw materials and process over time at the facility also do not warrant a more aggressive monitoring schedule.

As illustrated by the data summarized in Table 1, GC has analyzed wastewater quarterly for many years and has reproduced the resulting data since 2002 below. As also illustrated by the data summarized in Table 1, there has been no significant deviation or change in the data from the First Quarter of 2002 to the present. Accordingly, it is very unlikely that an increase in wastewater monitoring frequency will provide better resolution of data trends than those currently provided by the quarterly monitoring schedule with regard to regulatory compliance evaluation.

Table 1 – Summary of Wastewater Analytical Results 2002 – Present (All results in mg/L)

	<b>TDS</b>	<b>Sulfate</b>	<b>Iron</b>	<b>Arsenic</b>	<b>Chromium</b>
Q1, 2002	2800	1800	92	< 2.0	1.4
Q2, 2002	3300	2400	140	< 2.0	2.0
Q3, 2002	1900	1600	120	< 2.0	2.7
Q4, 2002	2000	1400	130	< 2.0	2.8
Q1, 2003	2500	2000	200	< 2.0	2.0
Q2, 2003	2500	4800	31	< 2.0	3.1
Q3, 2003	2700	2600	140	< 2.0	1.9
Q4, 2003	2600	2300	190	< 2.0	1.8
Q1, 2004	2500	1800	110	< 2.0	1.3
Q2, 2004	1900	1600	230	< 2.0	1.0
Q3, 2004	Data missing	Data missing	Data missing	Data missing	Data missing
Q4, 2004	2400	1900	330	< 2.0	0.7
Q1, 2005	4000	2400	510	< 2.0	0.3
Q2, 2005	2800	1800	180	< 2.0	1.0
Q3, 2005	2600	1800	150	< 2.0	0.9
Q4, 2005	3700	1700	100	< 2.0	0.5
Q1, 2006	2170	1900	3.8	< 2.0	0.7
Q2, 2006	5300	1650	200	< 2.0	1.0
Q3, 2006	2400	1390	260	< 2.0	.99
Q4, 2006	4900	1560	14	< 2.0	3.9
Q1, 2007	4250	1550	0.46	< 2.0	0.36
Q2, 2007	3640	1590	83	< 2.0	2.0
Q3, 2007	5400	1900	0.2	< 2.0	0.6
Q4, 2007	4500	1800	110	< 2.0	1.5
Q1, 2008	6500	1400	70	< 2.0	3.0



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Q2, 2008	Data uncollected	1900	130	< 2.0	1.9
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Therefore, GC hereby requests that the DOE change the draft permit to requiring a semi-annual monitoring frequency for wastewater.

## **ECOLOGY'S RESPONSE 5**

*Ecology disagrees with General Chemical's (GC's) comment that increased monitoring for process wastewater/mud should be reduced to semi-annual monitoring for wastewater. In the previous permit, the frequency for reporting was quarterly for metals. In the proposed draft permit, Ecology proposed to increase the frequency for monitoring metals to monthly. However, in light of the fact that the limits for metals are established for the groundwater (at monitoring well MW8B), that there is a considerable database already developed for Outfall 002, and the fact the General Chemical finds that additional monitoring is a financial burden to them, Ecology agrees to change the frequency of monitoring of metals at Outfall 002 in the proposed permit to quarterly intervals.*

## **COMMENT 6**

### **S2. MONITORING REQUIREMENTS**

#### **A. Wastewater Monitoring**

##### **2. *Monitoring Parameters* (pages 6 through 8 of 19)**

The draft Permit Special Condition S2.A retains arsenic as a wastewater monitoring parameter even though GC's analytical data from the First Quarter of 2002 to the present (see Table 1 above) indicates that arsenic has never been detected at or above the 2.0 mg/L detection limit in the wastewater. Accordingly, GC does not believe arsenic is present in the wastewater at levels that would pose a risk to human health and/or the environment. Therefore, GC hereby requests that DOE change the draft permit to remove the requirement to conduct wastewater monitoring for arsenic.

Also, the draft Permit Special Condition S2.A proposes to add Gross Alpha Particle Activity, Gross Beta Particle Radioactivity, Radium 226 and Radium 228 to the list of wastewater monitoring parameters. GC proposes that the permit be modified to indicate that one wastewater sample will be collected at the start of the permit period to evaluate potential radiation in our wastewater, and that a permit modification will be developed to include a radioactive particle and/or radionuclide sampling program to address any anomalous results identified from the initial sampling event. Appropriate wastewater discharge quality monitoring, if necessary, will be negotiated with the DOE based on the wastewater discharge sampling results. If no anomalous results are identified, no further wastewater or groundwater sampling for radioactive particles and/or radionuclides will be completed unless a change in conditions indicate that such sampling may be warranted. Further, we request the deletion of Gross Beta Particle Radioactivity, Radium 226, and Radium 228, as it is known that bauxite is free from these. Analysis for Gross Alpha particle Activity is sufficient to characterize this wastewater stream.

## **ECOLOGY'S RESPONSE 6**

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*GC requests to remove arsenic from the monitoring requirements for wastewater monitoring for Outfall 002. Ecology does not agree with this request. Arsenic has been noted to be present in their process wastewater/mud discharge. Based on Ecology's review of the data from DMRs submitted to Ecology from July 1, 2003, through December 1, 2007, the average concentration of dissolved arsenic was calculated to be 145 µg/L with a maximum concentration of 250 µg/L. The groundwater quality criteria for arsenic is 0.05 µg/L. There is no actively managed treatment system being used to remove metals from the discharge to land. The only means for removing arsenic is capture from adsorption and cationic exchange in the soils below the mud pond. There is a likelihood that breakthrough of contaminants may occur in the future. Breakthrough may already be occurring for contaminants such as sulfate. This enforces the need to continue monitoring arsenic in the discharge from 002. Arsenic is a contaminant of concern for this discharge. No change was made to the monitoring requirements for arsenic.*

*Ecology agrees to implement GC's proposed approach to first conduct a radioactivity characterization of Outfall 002's before requiring routine radioactivity monitoring as required in the draft proposed permit. Therefore, the routine monitoring for Gross Alpha Particle Radioactivity, Gross Beta Particle Radioactivity, Radium 226, and Radium 228 have been removed from S2.A of the permit. In lieu of these monitoring requirements a new Special Condition was added to the permit (S8.) to establish requirements to conduct a radioactivity characterization of Outfall 002 discharge and the groundwater. The previous Special Condition S8 (Duty to Reapply) was renumbered to be S9. Ecology reserves the right to modify the issued permit in the future to establish radioactive monitoring, as appropriate.*

*The conditions established in Special Condition S8 will specify the requirements for the characterization. These include: number of samples required, parameters to be sampled and tested, and test protocols. Ecology typically requires a minimum of ten data points to be collected which is considered sufficient to provide a representation of water quality. However, under the circumstances, Ecology will accept a minimum of three samples from Outfall 002, and each of the groundwater monitoring wells. Ecology requires that testing of all four of the originally proposed radioactivity indicators be measured for the characterization.*

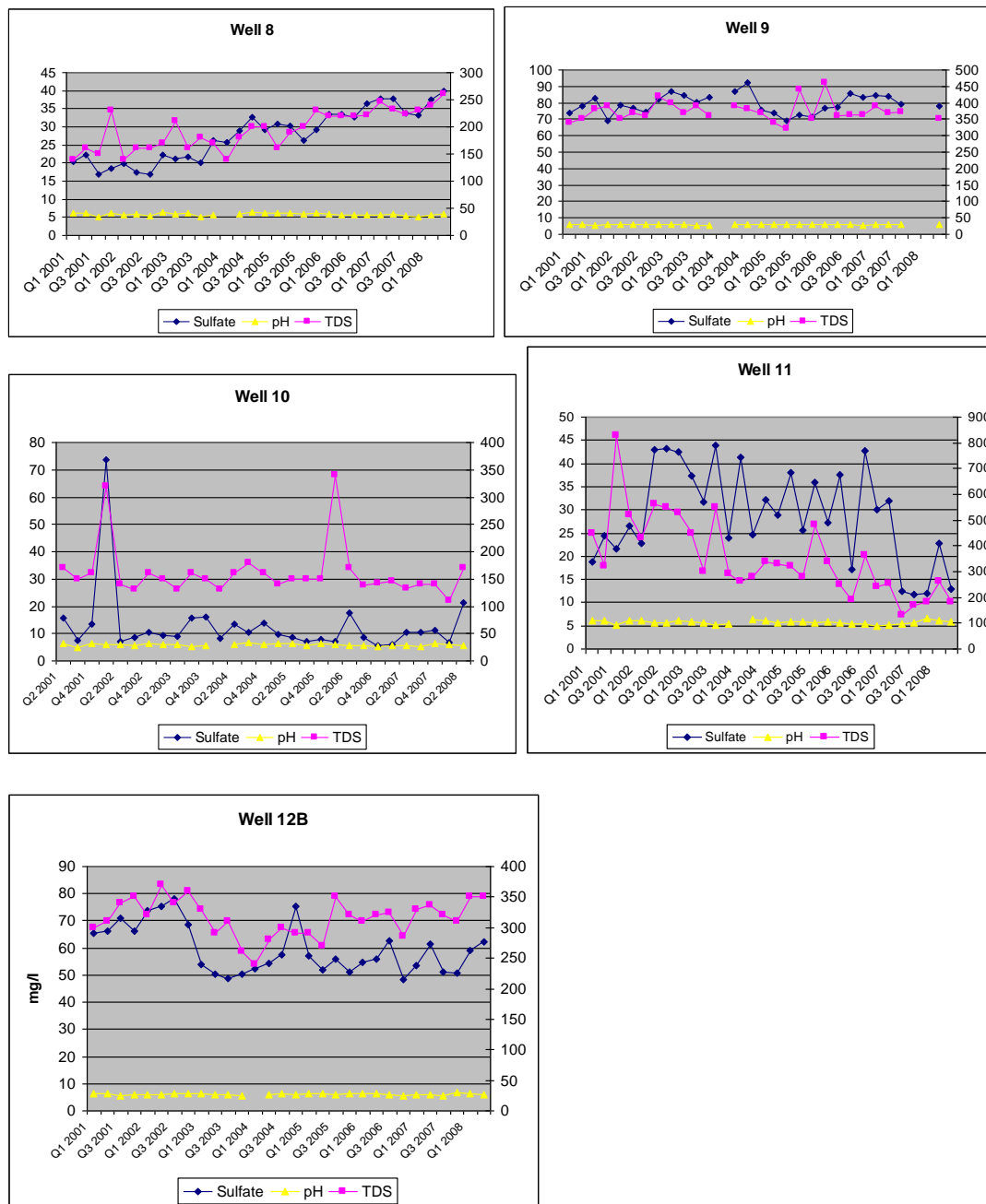
**COMMENT 7**

**B. Groundwater Monitoring**

**I. Monitoring Frequency (page 8 of 19)**

The draft Permit Special Condition S2.B proposes to change the frequency of groundwater analysis from quarterly to monthly. Such a change is not warranted because GC's historic quarterly groundwater monitoring data effectively include seasonal variations and, as shown in the graphs below, have produced relatively consistent data. Accordingly, an increase in groundwater monitoring frequency is not expected to provide better resolution of data with regard to evaluating regulatory compliance.

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Therefore, GC hereby requests that the DOE change the draft permit to require a semi-annual monitoring frequency for groundwater.

**ECOLOGY'S RESPONSE 7**

*Ecology disagrees with General Chemical's (GC's) comment that increased monitoring for groundwater should be reduced to semi-annual monitoring for wastewater. In the previous permit, the frequency for monitoring groundwater was quarterly. In the proposed draft permit, Ecology proposed to increase the frequency for monitoring groundwater to monthly. In light of the fact that General Chemical finds that additional monitoring is a financial burden to them and that there is a considerable database already*

*developed for the monitoring wells, Ecology agrees to change the frequency of monitoring of groundwater in the proposed permit to quarterly intervals.*

## COMMENT 8

### B. Groundwater Monitoring

#### 2. *Monitoring Parameters* (page 8 of 19)

The draft Permit Special Condition S2.B proposes to add Gross Alpha Particle Activity, Gross Beta Particle Radioactivity, Radium 226 and Radium 228 to the list of groundwater monitoring parameters. GC proposes that these groundwater monitoring requirements be removed from the permit and replaced by a statement that indicates that a permit modification may be developed to address sampling for some or all of these parameters based on the results of the wastewater discharge sampling described in Section S2.A.2 above. Appropriate groundwater quality monitoring, if necessary, will be negotiated with the DOE based on the wastewater discharge sampling results.

Also, draft Permit Special Condition S2.B proposes to add ferrous iron to the list of groundwater monitoring parameters. The fact sheet indicates that ferrous iron will be used to evaluate whether anoxic conditions exist. This would be better accomplished by measuring dissolved oxygen content and reduction/oxidation potential of the groundwater using equipment in the field during sample collection. Therefore, GC hereby requests that DOE change the draft permit to remove the requirement to conduct groundwater monitoring for ferrous iron in exchange for measuring dissolved oxygen and redox potential in the field.

Further, the draft Permit Special Condition S2.B retains iron, arsenic and chromium as groundwater monitoring parameters even though GC has not found iron, arsenic and chromium at levels at or above their respective Method 200.8 detection limits. Accordingly, GC believes this is evidence that GC's wastewater is having no impact on the levels of these metals in the groundwater at the GC facility. Therefore, GC hereby requests that DOE change the draft permit to remove the requirement to conduct groundwater monitoring for iron, arsenic and chromium. It is also important to note that draft Permit Special Condition S2.B proposes to add lead and mercury to the list of groundwater monitoring parameters, which GC is willing to accept to the extent that data for these metals may be more meaningful than continuing to collect data for iron, arsenic, and chromium.

## ECOLOGY'S RESPONSE 8

*Ecology agrees to implement GC's proposed approach to first conduct a radioactivity characterization of the groundwater before requiring routine radioactivity monitoring as required in the draft proposed permit. Therefore, the routine monitoring for Gross Alpha Particle Radioactivity, Gross Beta Particle Radioactivity, Radium 226, and Radium 228 have been removed from S2.B of the permit. In lieu of these monitoring requirements a new Special Condition was added to the permit (S8.) to establish requirements to conduct a radioactivity characterization of Outfall 002 discharge and the groundwater. The previous Special Condition S8 (Duty to Reapply) was renumbered to be S9. Ecology reserves the right to modify the issued permit in the future to establish radioactive monitoring, as appropriate.*

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*Ecology agrees with the proposal to measure dissolved oxygen and redox potential instead of ferrous iron for groundwater monitoring. These changes were made in the proposed permit in S2.B.*

*Ecology does not agree that iron, arsenic, and chromium should be removed from groundwater monitoring requirements. Even though Ecology agrees that previously collected data show that these parameters are below and have met the groundwater quality criteria, these metals concentrations were found to be significantly high. It may be only a matter of time before, these metals breakthrough the binding effects of the soil matrix and begin leaching into the groundwater below. Furthermore, the groundwater contains an antidegradation requirement which presents groundwater already below the criteria to be degraded further. Ecology has decided to keep the monitoring requirements and the limits for iron, arsenic, and chromium in the groundwater. Therefore, no change has been made to the permit.*

**COMMENT 9**

**S5. SOLID WASTE DISPOSAL**

**C. Solid Waste Control Plan** (pages 14 and 15 of 19)

The draft Permit Special Condition S5.C requires the submittal of a Solid Waste Control Plan to DOE postmarked no later than September 30, 2008. In light of the uncertainty regarding the issuance date of the final permit, GC recommends that DOE change the September 30, 2008 deadline to a deadline “within 90 days of issuance of the permit.”

***ECOLOGY'S RESPONSE 9***

*Ecology agrees that the due date for the plan must coincide with the intent to require the plan to be submitted 90 days after the effective date of the permit. This change has been made.*

**COMMENT 10**

**S7. GROUNDWATER MONITORING PLAN** (page 16 of 19)

The draft Permit Special Condition S7. requires the submittal of a Groundwater Monitoring Plan to DOE postmarked no later than September 30, 2008. In light of the uncertainty regarding the issuance date of the final permit, GC recommends that DOE change the September 30, 2008, deadline to a deadline “within 90 days of issuance of the permit.”

***ECOLOGY'S RESPONSE 10***

*Ecology agrees that the due date for the plan must coincide with the intent to require the plan to be submitted 90 days after the effective date of the permit. This change has been made.*